Artificial Intelligence within Academia

An Honors Thesis (Honors 499)

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Abstract

Artificial Intelligence (AI) is an up and coming technology that has and will continue to transform our world. The advanced technology is increasing in the number of industries that it is applied. AI is being implemented in many different fields, completing jobs in a much more effective and efficient manner. Due to the consistency that AI will have in many industries, education systems are working to adapt to the new environment. I specifically analyze Ball State University and the actions the BSU is taking to prepare its students for the technologically advanced world.

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Process Analysis Statement

When my process with my thesis project began, I was struggling to come up with a topic to write about. I knew I was not going to be able to complete a creative project, so I needed to find a research subject. Naturally, I wanted my thesis to relate back to my major in some way; I just spent four years studying Accounting, so I might as well include it. I began by mapping out some ideas, but that did not go nearly as far as I had hoped. I contacted my thesis advisor, a professor whom I had formed a relationship with over my years at BSU We discussed the research ideas that she had already started working on, but none of those struck me as something I could spend my semester researching. I then started brainstorming on what I had learned in her classes specifically, and what about those topics interested both my advisor and me. In the end, we settled on artificial intelligence.

However, AI is an extremely wide topic. Further, the topic has already been researched, dissected, and put back together a monumental number of times. We needed to be more specific, and we needed to find a way to make my project a little more eventful. After more analyzing with my advisor, we concluded that we are both surrounded by this world of academia. Given this fact, incorporating education within the topic of AI may give me a little more interest and passion to complete this project. Thus, my thesis project was to be about AI within Academia.

Starting my outline for the project, I first wrote out all of the main ideas that I knew, learned, or even just heard. I then began to do some light research on the main, hot topics of AI and what seemed necessary to include in my paper. This set of information

was to be the first half of my paper. My advisor and I felt as though it was important for my audience to completely understand what AI was and everything about it before I dove into incorporating it with education. In this way, I became part of my audience, with a sneak preview of the thesis itself.

Throughout my research about artificial intelligence, I learned what it is, how it works, and most importantly, in my opinion, the future of AI. While I knew that AI was going to shape our future in one way or another, I did not realize how much potential that it truly has. However, upon learning this, I was only more assured that I needed to work to understand how AI has worked with education and where education should start to head knowing that AI will be present.

My research was done in two different ways. The first was with my initial look into artificial intelligence with regards to this project. I noted key articles that provided explanation on topics that I wanted to dive into. I let this first round of broad research shape my paper to some degree. The main topics that stayed consistent from article to article were essential to my paper. However, I also knew of topics that I wanted to cover. This research was done more intricately. I looked for articles that helped explain specific ideas, while at the same time, cross referencing them with other data to ensure that the information was accurate.

When considering the direction I was going to take with the academic aspect of my thesis, I needed to show the audience that artificial intelligence is and will continue to be a vital part of our lives. This, to me, was not so much an argument to be made, but rather stating facts of what is and what will be within our world. I wanted the audience to

understand the importance of including AI within education in one way or another. Within my thesis, I worked to show that AI is important not only to those working directly with the technology, but also just about everyone. And because of this, it is essential that education begins to incorporate these topics.

I decided to include information about both education in a broad sense, and also information about Ball State University specifically. I needed the information about miscellaneous colleges, high schools, and grade schools, along with education overall to give my ideas depth and structure. But I also wanted to touch on Ball State itself because BSU has taken measures to look at AI and it provides ample opportunity to dive directly into the technology. Looking at Ball State also gave me more of a connection with my project altogether, motivating me to write and write well.

One challenge that I came across was with my argumentative voice. I had to find a balance between stating facts and persuading the audience that the information that I am sharing is of high importance. I did not want to be argumentative because I wanted the information to speak for itself. I believe that AI is powerful and diverse enough to reach new boundaries. I do not want the audience to think that I am fighting for its value. However, I also want to be confident in what I am writing. And I need my confidence to shine through the data and information that is within my thesis.

This project has been a heavy weight to carry for some time now. But needless to say, I am proud of the work that I have put into it. The hours that I have spent researching, writing, looking for the right words, and saving my document (out of complete fear that I would lose the work I had already done) show the dedication that I

put into this project. I am overjoyed and relieved that I have finished this thesis, knowing that I gave it my all and that it is worth the read.

What is Artificial Intelligence?

January 14, 2011 was a day to remember in the history of the game show "Jeopardy!" Two long-term "Jeopardy!" contestants, the all-time best champions, decided to take on the challenge of facing a brand new guest to the show. This new guest's name is Watson. Watson is an "IBM supercomputer that combines artificial intelligence (AI) and sophisticated analytical software for optimal performance as a 'question answering' machine," (Rouse 2018). At the end of the first round of the game, Watson was tied with one of the champions for first place. The supercomputer was performing well, but not perfectly. As "double jeopardy" came around, Watson picked up his game and took the lead. In "final jeopardy," Watson made his guess and his wager and answered the question correctly. This led the supercomputer to victory, ending with a total of $77,147. Watson proved that the technology and data analytics could be a powerful tool. Artificial intelligence can be applied to solve problems people truly care about. One of the co-creators of Watson noted, "I thought this was the end, we get there, we're done. And I'm realizing this is just the beginning" (Lewis 2014).

When working to explain what artificial intelligence is, the definition alters somewhat significantly based on the complexity and point of view that one is taking. In a broad scope, Encyclopædia Britannica defines artificial intelligence as "the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings" (Copeland 2019). Depending on the field of interest or the details

requested, this definition can grow in length and depth. However, looking at this simpler explanation shows the essential aspects of AI: "Computer or computer-controlled" and "intelligent beings." Artificial intelligence has a technological base that is able to function based on the controls of human beings. However, the system is one that can eventually learn on its own.

The world of AI is much larger and more common than one may think. Devices, systems, and services that use artificial intelligence in one way or another can range from everyday use items or they can be expensive, extremely advanced machinery. Starting with the more commonplace, AI can be found in most homes. Siri and Alexa are voice activated assistants that are designed to improve over time with human interaction. The AI within these devices allows the technology to learn and adapt with their user. After interactions between the human and the device, the AI includes the "human idiosyncrasy" that is learned (Maguire 2019). Other well-known services that use AI include Amazon and other online shopping. The website will track recently viewed items and a plethora of other data to form suggestions for the shopper. This increases customer satisfaction with the ease of shopping and the numerous options.

However, artificial intelligence can be much more complex and effective for different resources. AI works well with fraud detection and cyber security. The technology is integrated into security and detection software to find details and evidence that human eyes do not typically notice. Accounts of fraud often use similar patterns or strategies as other frauds, giving AI the chance to learn the pattern and catch the copycat, (Intelegain 2019). Other patterns that AI is used to capitalize on are algorithms used for different purposes. Stock trading is perfected to some degree by recognizing specific

characteristics. Computer systems that use AI reasoning focus on making decisions that are based on data as opposed to “trading theories” (Intelegain 2019). This process has

increased the success of stock trading just as AI has increased the success in many other forms.

As hinted at by many of the mentioned examples, artificial intelligence is the technology that works to understand patterns and other data to perform specific tasks. By sifting through a large amount of data, "AI systems perform intelligent searches, interpreting both text and images to discover patterns in complex data, and then act on those [discoveries]" (Otte 2020). The original data comes from humans and is typically given in extreme quantities to allow the technology to draw the most stable conclusions. From there, AI provides information that can be used in an infinite number of ways to advance the world today. The longer the technology is used, the more predictive it can be based on previous actions. The software eventually creates a blueprint over time with the data that has been provided and manipulated. Because of this, time can be saved and more opportunities are presented.

Because artificial intelligence is present in our current day and age, not only should we know what it is, but we should also understand how AI is transforming the world. AI can be applied in many professions. Taking that a step further, AI can progress a profession further than it was ever imagined. Manufacturers are using AI with robotics on assembly lines to increase efficiency. Healthcare professionals are using AI to ease schedules and create more time for doctors and nurses. More accurate diagnoses are also coming from the use of AI in the healthcare world. AI machines are assisting in processing large quantities of data to make investment decisions (Daley 2018). Artificial

intelligence is providing brand new opportunities that save time and money within every aspect of life. Now is the time to take advantage of these opportunities.

Clearly, artificial intelligence is a powerful tool that opens many possibilities. However, this technology can be even more dynamic when it is paired with other advancements. For example, artificial intelligence works extremely well with Blockchain. Blockchain is the record-keeping technology behind the Bitcoin network (Reiff 2020). This technological advancement is typically difficult to explain and understand. In its simplest form, Blockchain consists of blocks digital information that is stored in a chain of a public database. A single block can store up to 1 megabyte (MB) of data. One MB can be thought of as a few thousand transactions. When new information is looking to be stored, a new block can be created, named, and then strung together along the chain of information. In the end, the main goal of Blockchain is to allow digital information to be recorded and distributed, but not edited (Reiff 2020).

Where does artificial intelligence come into play with Blockchain? The mass amount of data and information that is being stored in the blocks can be used within the technology of AI. The information can be shared between models, devices, websites, and more. "Blockchains can help serve as a 'master brain' in a manner shared across multiple AI systems" (Schmelzer 2019). Combining the information of Blockchain and the ability of artificial intelligence provides for a powerful system. The network would be full of unbiased information, because of the different pathways of data, allowing AI to create a clear-cut system of resources.

Another form of information that compliments artificial intelligence is a term called Big Data. Big Data is just as it sounds: "Data sets that are so vast and complex that they require new and powerful computational resources to process" (Big Data 2020). This is the material that AI thrives off of. AI can take this massive quantity of data and transform it into an extremely useful tool. The more information AI has to work with, the stronger the patterns AI can create and the more effective conclusions that can be drawn from said data. Artificial intelligence is a much stronger asset when it is integrated with tools such as Blockchain and Big Data.

Artificial intelligence is being used all over the world in several industries to improve the workings of businesses, machineries, processes, and more. But the technology is also being used in other light hearted and innovative ways. A few examples are listed below:

- *Judge Fake People*. Mike Solomon created this app purely for entertainment. He wrote a script to download an image of a fake person and paired it with a voting system. He also allowed for comments, "just for fun." Consumers can sit and vote on the fake people and chat amongst other participants.
- *Creating pick-up lines*. Janelle Shane fed a network a plethora of pick-up lines. The neural network then analyzed the patterns and began to create its own lines of seduction.

- *Scripting advertisements*. The same Watson that participated in the game of "Jeopardy!" has written a commercial for Lexus. The AI studied audio, text, and visual data from successful car advertisements to create its own.
- *Developing perfume formulas*. Systems compared fragrance formulas with their sales to conclude which scents are most popular. The data is used to create new perfumes that will continue to be successful.

- *Making Pizza*. MIT students along with researchers created an AI system to come up with new pizza recipes. Some recipes needed a little help from a human mind because they either lacked vital ingredients or chose ones that did not exists, (Macaulay 2019).

The Future of Artificial Intelligence

The term "artificial intelligence" was coined in 1956 at a conference at Dartmouth College in Hanover, New Hampshire. However, some argue that this type of intelligence has been around since the ancient Greeks, with their myths about robots. Chinese and Egyptians also had engineers, who built moving mechanical devices, imitating a human being called automatons (Lewis 2014). In the more recent years, artificial intelligence has become a hot topic, taking off in the world of innovation. Engineers, inventors, and entrepreneurs are attempting to capitalize on the explosion of modernization. For example, about 18% of the patents received by IBM inventors were related to AI. Also, Elon Musk, the founder of Tesla, is donating millions of dollars to fund research on the subject (Thomas 2019). Artificial intelligence has confirmed its role in today's spotlight.

Because artificial intelligence has made an impact in every major industry, the technology has a structured foundation to continue to grow. The future of AI is unknown, though it is incredibly optimistic. "I think anybody making assumptions about the capabilities of intelligent software capping out at some point are mistaken," says David Vandegriftn, Chief Technology Officer of company 4Degrees (Thomas 2019). The possibilities truly do seem endless. Companies are shifting their budgets more towards the developmental side of AI products and services. This is especially true for large tech

companies such as Google, Apple, Microsoft, and Amazon. Even the United States Department of Defense is working to increase their use and understanding of artificial intelligence. Some of these future plans are practical and planned down to the smallest detail. However, others are more theoretical with high hopes for the potential of the technology. Nonetheless, artificial intelligence will not be going anywhere anytime soon.

But how will artificial intelligence impact the world? Many people are concerned that AI will soon be taking over their jobs. And to some degree, their concern is justified. Research shows that "the bottom 90 percent, especially the bottom 50 percent of the world in terms of income or education, will be badly hurt with job displacement" (Thomas 2019). AI will begin to replace the more quantitative, or objective jobs. This goes for repetitive and routine jobs such as washing dishes, customer service, and other very scripted activities. The transition from humans to AI technologies is due to companies' desires to be more effective and efficient. No matter how hard an employee works, there is still human error occurring. Also, once companies begin to implement AI technologies, they do not have to pay the technologies hourly or salary. In the end, artificial intelligence is saving the company time and money.

While artificial intelligence may be taking the place of some jobs, the advancement can also be securing other jobs and creating more for the future. In order for AI to be as successful as it is hoped to be, people must understand how to create, function, and fix different technologies. The ability to understand the language that technology speaks is and will continue to be a prized possession. Marc Gyongyosi of Intelligence Flying Machines, Inc. says, "People need to learn about programming like

they learn a new language, and they need to do that as early as possible because it really is the future. In the future, if you don't know coding, you don't know programming, it's only going to get more difficult" (Thomas 2019). Many new avenues are coming about for those looking to work towards the future. AI is not going to take over the world and destroy everything in its path.

Although artificial intelligence is not going to destroy the world, it does not mean it will not shift certain ways the world functions. As noted before, new jobs could be coming from AI. And because the technology is so advanced and attractive to companies everywhere, said companies will be searching for ways to capitalize on AI. One of the most efficient ways to do this is with new hires. But before looking at the candidates themselves, AI allows hiring teams to access more potential employees in a more efficient way. Many employers use more traditional methods of recruiting, such as job fairs, referrals, and even word of mouth. But with AI, new opportunities arise. "By using AI-powered tools such as chatbots, employers will able to process a higher volume of candidates more quickly and cost effectively" (How AI Changes 2020). Finding candidates this way cuts down on cost, especially opportunity cost. Over time, the systems would improve function, thus improving output. Just as Amazon has created ways to display items that would interest its users, these AI-powered tools would bring in top talent, adding to the value of the company quickly and easily.

Now, looking at the potential employees, how are they going to set themselves apart in this competitive working environment? Naturally, a list of soft skills comes to mind, including but not limited to creativity, collaboration, adaptability, and presentation.

When it comes to hard skills, according to LinkedIn, Blockchain is the number one skill that is most in-demand. Cloud Computing, Analytical Reasoning, and artificial intelligence follow Blockchain, (Pate 2020). All four of these skills are to do with the advancing technologies in our world today. Specifically with artificial intelligence, Pate says, "The people who can harness the power of AI, machine learning, and natural language processing are the ones who will help organizations deliver more relevant, personalized, and innovative products and services" (Pate 2020). Companies want to take advantage of the employees who can adapt in this era of enhanced technologies. Even if one's goal is not to be employed with a company and work towards continuing the advancing of that company, it could still be beneficial to have some understanding of artificial intelligence. AI is the future. The technology will continue to grow and thrive in major industries, and it will start to infiltrate into smaller industries. AI has found itself into the majority of homes, hand-held devices, and other everyday use items. Educating oneself will only become more difficult as time goes by. However, many people are still somewhat afraid of the technology and what it is capable of. Here is a list of myths about artificial intelligence along with sound reasoning to debunk the myths:

1. *Artificial intelligence is going to replace all jobs*. In our history, we have experienced many industrial revolutions that have affected employment. However, the number of jobs has stayed rather consistent during these times. According to Bernard Marr & Co., "Despite what doom-mongers have said there's very little actual evidence to suggest that mass unemployment or widespread redundancy of human workforces is likely" (Marr 2019). It is more

likely that the economy will be more productive, allowing for more focus on other pursuits.

2. *Only low-skilled and manual workers will be replaced by artificial intelligence and automation*. Many of the activities that AI is replacing come with a more complicated job. For example, part of an accountant's daily work consists of data entry. If AI were to take over this aspect of the accountant's job, the accountant would have more time to focus on more complex matters. Also, artificial intelligence would not be able to replace the aspects of the job that require a personal touch. The accountant would have more time to work with clients and adjust to their needs more efficiently. This would allow the accountant to become more competent with human interaction and other activities.
3. *Super Intelligent Computers will become better than humans at doing anything we can do*. Specialized artificial intelligence mechanisms become hyper focused in one specific job or activity. This AI masters the job and continues to improve, making the activity extremely efficient. But the specialized AI masters this one job and this one job only. Generalized artificial intelligence can be applied in many different jobs. However, it is increasingly difficult for the AI to master the multiple tasks that it has been given. The AI technologies are not capable of being as multidimensional as humans.
4. *Artificial intelligence will quickly overtake and outpace human intelligence*. Human intelligence has many different factors that work together. Some of these factors artificial intelligence has already overcome. For example, computers can

calculate and recall information much quicker than humans. However, human beings are far more superior in other forms of intelligence. AI lacks the ability to

be creative and to feel emotion. Humans exceed AI in these areas, and thus, not allowing AI to overcome the human race.

5. *Artificial intelligence will lead to the destruction of enslavement of the human race by superior robotic beings.* Although this last myth seems to be farfetched and overdramatic, some highly praised entrepreneurs such as Stephen Hawking and Elon Musk believe the danger is real. However, here and now, the threat level is low. It is very unlikely that an AI technology will be created with the ability to make its own decisions to turn on the human race and cause massive destruction against us. This case may be a possibility in the far distant future, but it should not be on the list of worries anytime soon (Marr 2019).

Artificial Intelligence in Education Today

To reiterate, artificial intelligence is present in today's world and the technology is only going to increase in its usage and necessity. Because of this, many universities, colleges, high schools, grade schools, and any other academic facilities are now including AI topics within classes to their registration list. The institutions are also creating clubs and other extra-curricular activities to aid in the learning and discovering of the artificial intelligence atmosphere. Many new opportunities have been drawn up to offer students the exposure in to this high tech environment.

Colleges and universities seem to have the most freedom and flexibility in offering classes that revolve around artificial intelligence technologies. With majors and minors such as computer science (CS) and Information Technology (IT), adding AI specific classes will allow for a richer area of study. But the classes do not just support CS and IT students. Almost any major could benefit from adding AI focuses classes to

their portfolio. "Colleges need to be full participants in preparing students to contribute to the growth of a beneficial AI ecosystem" (Villasenor 2019). Because AI is breaking into most industries, students should be able to have the chance to deepen their understanding of the rising technology.

Multiple classes have been created and offered to students of all studies. For example, the Pritzker School of Law at Northwestern University offers a course titled "Law of Artificial Intelligence and Robotics." UCLA offers "Artificial Intelligence and New Media." University of Michigan has a class called "Minds and Machines" and Stanford has a course on "The Future of Finance" (Villasenor 2019). These classes are expanding the minds of students in departments of communications, philosophy, economics, and many more. Professors, faculty leaders, and administrators work together to find where classes could be implicated, given the current resources and demands of employment. "Universities [are] making AI a more prominent part of their respective curricula; MIT alone is dropping $1 billion on a new college devoted solely to computing, with an AI focus" (Thomas 2019). Each year, new courses are being generated to prepare the students for the furthering of advancements.

While high school curriculums are not as malleable as college, students still have the ability to build their schedule to their liking in one way or another. But, "the development of an AI curriculum is in its early stages" (Insights Team 2019). High school programs are working to create the blueprints for an AI education. Educators and researchers want to develop guidelines on a national level for both primary and secondary education. This AI education will mostly be big picture, working to teach students the basics of teaching a computer how to learn. The goal of the education is to allow the

students to be able to grow and evolve with the technology as it continues to grow and evolve.

Although classes are still being work shopped for the high school level, there are many programs outside of the school setting that have allowed students a head start in the field of artificial intelligence. One of these events was a competition for the best model that could spot signs of pneumonia in x-rays of lungs. The Radiological Society of North America sponsored the competition, offering $12,000 to the best model (Insights Team 2019). Events like these have multiple benefits. One being that the participants get an opportunity to experiment and create equipment using AI technologies. The companies sponsoring the event also get a handful of new models to work with and maybe have the ability to expand upon for further research. Both parties gain new perspectives on the ideas of artificial intelligence in these situations.

If the goal of the potential high school classes and the programs currently offered to high school students was to provide the students with the basics of artificial intelligence technologies, then why not start the foundation even earlier? As the digital age continues to progress, this seems to be the plan. "Students need to start learning how to design, manipulate and work alongside AI machines in order to build the foundation they need as they prepare to enter the workplace" (Passow 2019). The current K-12 students will enter the workforce when AI is in full swing. Introducing the information and programing now will only help ensure that they will be set up for success. "For many in this generation, AI will be an often overlooked, magical force that powers their lives much as electricity, the internal combustion engine, and networking technology power

ours" (Passow 2019). Because of this, there will be a need within the generation to understand, fix, and function artificial intelligence.

Artificial Intelligence at Ball State University

At Ball State University, the best and most immersive way into the world of artificial intelligence is to be a computer science major. "As a Computer Science major at Ball State, you'll begin by learning the fundamentals of programming, algorithms, and discrete mathematics before pursuing upper-level specializations such as software engineering, programming languages, theory, web and mobile platform development, operating systems, networking, and databases," (Ball State University 2020). A computer science major will provide the foundations needed to explore AI. This area of study will allow the student to enter into many positions within the technological field, which tends to fall into every major industry.

Signing on to be a computer science major or even a minor will give a student the ability to work with immersive learning projects. Large companies such as Google have partnered with the students to work on different projects together. Students are thrown into a real-world experience and gain new insights. This allows them to form strategies and become more rhythmic in their work, showing benefits in their schoolwork but also promise for their future line of work.

Within the computer science major, students will take classes such as "Advanced Programming," "Database Design," "Operating Systems," and "Theory Computation," (Ball State University 2020). Students will also be asked to take calculus, along with biology, chemistry, or physics. All together, these classes will teach students how to work with computer systems, how to be an effective member of a software development

team, how to be proficient with programming languages, and analytical and communication skills for computer scientists.

One advantage of studying computer science at Ball State is the fact that the university uses Python. Python is a programming language that is used in a multitude of ways. "It includes high-level data structures, dynamic typing, dynamic binding, and many more features that make it as useful for complex application development as it is for scripting or 'glue code' that connects components together" (Open Source 2019). The software has proved beneficial for programmers, computer system administrators, and many more. One major highlight to Python is that the software has a strong community. Because of its popularity, Python attracts many users that often meet around the world at conferences (Open Source 2019). Mainly, this community means that if there is a problem that one is trying to solve, it is likely that members of the community have already solved or are working to solve said problem. And even further, members can share the code, documentation, or tutorials of how to work through the issue. This software is advanced enough to appeal to those who are challenging themselves and their abilities. Python is also a good platform to begin learning the programming language with endless sources of information.

Being a Computer Science major or minor suits some students perfectly, however it is not for everyone. In this case, the CS classes can be a good introduction to the technological field. Depending on the prerequisites for the classes, anyone belonging to any major can take entry-level CS classes. This is a good way to learn the basics without having to completely dive into the world of programming. Adding a few CS classes here

and there can be beneficial for any major, but it especially compliments those who are studying accounting, finance, economics, mathematics, and engineering, to name a few. These majors in particular are entering industries that will use AI heavily for daily tasks. Creating a foundation and structure for AI by taking some CS classes will provide for more success in these major areas.

Ball State University's masters programs also offer opportunities to further one's education with technological sciences. BSU does offer a master's degree in Computer Science. There are two paths that a student will choose from within the master's degree. The first is a traditional/theoretical track, which requires courses in graph algorithms and theory of computing. The other path is a software engineering track, which includes courses that are more similar and also part of the software engineering degree (Ball State University 2020). Both of these choices will ensure that a student will be prepared to enter the technological industry.

Many of Ball State's other master's degrees offer more education on fields that relate back to artificial intelligence. For example, students can continue their education by earning a master's degree in Accounting. Within this degree, accounting students will focus not only on professional accounting, but also on data analytics. "This program provides you with the necessary tools for advanced academic study of accounting and the technical competence in both accounting and data analytics for the accounting profession," (Ball State University 2020). Understanding data analytics is a step towards working with AI. Multiple data analytic tools put together creates the functioning aspect of artificial intelligence.

Furthering Ball State's Education on Artificial Intelligence

Ball State University offers many opportunities for its students to prepare themselves for a world of artificial intelligence. Due to the fact that AI is growing extremely quickly and continuing to evolve, BSU should be working to progress its education with the advancing technology. "Colleges need to ask themselves what they can do today to prepare students to help build a future in which the power of this extraordinary technology is used in maximally beneficial ways" (Villasenor 2019). The responsibility of a college or university is to set its students up for success. Ball State is no exception from this duty.

The department of Computer Science first and foremost has the responsibility of staying up to date on the new findings regarding artificial intelligence and its related parties. The leaders should then work to implement the information into their classes, continuously updated the students on new advancements. With each break though comes more information that will be vital for a Computer Science major. However, the students should begin to take the responsibility upon themselves. If they are to be successful in their respective field of work, the students should understand how to research, update, and understand new bouts of information that is being shared. Professors are to find this balance between giving information and teaching to find information within their classrooms.

The responsibility of educating students about artificial intelligence does not strictly fall on the professors and other staff that work within Computer Sciences. Other departments are going to be affected as well. Namely, classes that focus on morals and

difficult ethical matters will need to dissect the issues that can stem from AI. These classes could include philosophy, legal studies, and several classes from the Honors College. Classes like these and many others can "help navigate the complex questions that will arise as we give machines more power to make decisions" (Villasenor 2019). Monitoring the advancements and judging how the technology should be controlled and contained to continue to be safe will need to be an ever-growing conversation.

Beyond, the actual understanding of artificial intelligence within Computer Science and the ethical dilemmas that will occur in the midst of philosophy, legal, and other moral related classes, students in every other class should be allowed the opportunity to learn about AI within his or her respective department. For instance, Economics students should explore how AI will change labor and manufacturing. Accounting students should understand how AI could provide shortcuts within their day-to-day activities. Political Science students should research the geopolitical implications of AI (Villasenor 2019). Within every field, there is a reason to study artificial intelligence. The technology will eventually breakthrough into each industry, if it is not already present.

"I'm realizing this is just the beginning," said the co-creator of Watson. All of the research done to explain what artificial intelligence is going to quickly change and adapt as the technology advances. Though the key facts and basic concepts about the systems and software will provide a basic foundation of understanding to add on to. The future of artificial intelligence is an extremely optimistic idea that is becoming reality. A plethora of efforts are being made from many different avenues to bring that future to the present. And because of all of this, education is beginning to adapt to ensure students will be able

to thrive in their era of working and career making. Institutions are modifying and adjusting to new ideas and needs for their students, starting with colleges and universities, but also making its way down to high schools and even grade schools. Specifically, Ball State University is making improvements to its current academic environment. Working with each major, BSU had included new ways to implement artificial intelligence. Looking at the future of Ball State, the education should continue to update the material as the technology continues to advance; however, it should also update classes that will be affected both directly and indirectly by artificial intelligence. The technology will reach more than just what is initially expected.

Artificial intelligence is the here and now. It is also what lies ahead. Choosing to educate oneself and the upcoming generations is the only way to ensure for a productive and flourishing future. Large institutions and school systems have the power and right set of circumstances to provide students with this education. Both the academic organizations and the students should take advantage of the times and try to create a structure of understanding of artificial intelligence while the technology is as simple as it will be. The only direction that AI is moving is towards the complex and elaborate.

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